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EXAMINER

BURGESS, BARBARA N

ART UNIT PAPER NUMBER

2157

DATE MAILED: 02/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/397,850

Applicant(s)

DAVIS, ARLIN R.

Examiner

Barbara N Burgess

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 02 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

This is in response to applicant's amendment filed on December 2, 2002. Claims 1-24 are presented for further examination.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 9-10, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwab in view of Kinoshita et al. (hereinafter "Kin", 6,219,583 B1).

As per claims 1, 9, and 17, Schwab discloses a method of reading data from a remote memory of a remote device to a local memory of a local device across a network, method comprising:

- Sending a message from said local device to said remote device, said message including a transport header indicating the message type of said message (column 2, lines 3-10, column 3, lines 21-22, column 4, lines 9-10, 21-23, column 6, lines 48-50, 59-62, column 7, lines 3-4, column 8, lines 2-3, Figure 2);

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- Determining whether or not the transport header of said message identifies the message as a type of remote Direct Memory Access read operation (column 3, lines 25-27, 31-36, column 6, lines 48-68, column 7, lines 40-50, column 8, lines 1-5).
- If the remote device determines that the message is said type of remote Direct Memory Access read operation, then performing a remote Direct Memory Access operation to said local device in accordance to data elements included in said message (column 4, lines 46-63, column 6, lines 48-68, column 7, lines 15-25, 40-64, column 8, lines 1-5).

Schwab does not explicitly disclose:

- Processing said message, in said remote device;

However, the use and advantages for processing message in remote device is well known to one skilled in the relevant art at the time the invention was made as evidenced by Kin (column 5, lines 56-67, column 6, lines 1-49).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate processing message in remote device in Schwab's method in order to determine whether the access request is a read-request.

As per claims 2, 10, and 18, Schwab discloses:

- Data elements in said rDMA read message identify a set of source buffers in the remote device which reference the remote host-side memory and a set of destination buffers in the local device that reference the local memory (column 6, lines 47-68, column 7, lines 44-64, column 8, lines 1-12, 14-30, 33-49).

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3. Claims 3-4, 11-12, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwab ⁱⁿ view of Kinoshita et al. (hereinafter "Kin", 6,219,583 B1) and in further ⁱⁿ view of Osborne.

As per claims 3, 11, and 19, the teachings of Schwab, in view of Kin, does not explicitly disclose the source and destination buffers being registered with the Virtual Interface network interface controller of the remote and local device.

However, the teachings of Osborne disclose receiving a virtual address from a controller in the network interface and determining the physical address based on the virtual address (column 1, lines 65-67, column 2, lines 29-31, column 8, lines 16-20, 48-50, 52-54). Therefore, Osborne implicitly discloses source and destination buffers being registered with the Virtual Interface network interface controller.

One of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate a Virtual Interface network interface controller in Schwab's method to ensure appropriate data transfer protection and reduce the interaction of the operating system, which in turn conserves host processing cycles enabling an increase in the number of cycles available to application programs while decreasing the overall time it takes to receive messages.

As per claims 4, 12, and 20, Osborne further discloses data elements of the rDMA read message specifying the source buffers and destination buffers as multiple data segments with offsets and designating a channel of the Virtual Interface as the data path for the rDMA write operation (column 7, lines 7-9, column 8, lines 37-39,

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column 9, lines 44-55, column 11, lines 12-15, 36-37, column 13, lines 30-32, column 22, lines 48-49).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate the use of data segments with offsets and a channel of the Virtual Interface as the data path in Schwab's method to ensure appropriate data transfer protection and reduce the interaction of the operating system, which in turn conserves host processing cycles enabling an increase in the number of cycles available to application programs while decreasing the overall time it takes to receive messages.

4. Claims 5-6, 13-14, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwab in view of Kinoshita et al. (hereinafter "Kin", 6,219,583 B1) in further view of Osborne and in further view of Krishnan et al. (hereinafter "Krishnan", 4,922,416).

As per claims 5, 13, and 21, the combined teachings of Schwab, Kin, and Osborne does not explicitly disclose a data element of the rDMA read message specifying the last data segment and completion of the rDMA read request.

However, in an analogous art, Krishnan discloses an end of message signal that indicates the completion of a process or data transfer (column 1, lines 31-33, 42-46, column 4, lines 48-50, 53-55, column 5, lines 36-38, column 7, lines 8-10, column 8, lines 10-12). Therefore, Krishnan implicitly discloses a data element of the rDMA read message specifying the last data segment and completion of the rDMA read request.

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One of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate a data element specifying the completion of a rDMA read request in Schwab's, in view Osborne, method in order for a data process or transfer to be completed quickly and efficiently by enabling other read/write requests to be executed.

As per claim 6, 14, and 22, the combined teachings of Schwab in view of Kin does not explicitly disclose data is read directly from the remote memory of the remote device into the local memory of the local device over a virtual interface without making an intermediate copy. However, this feature is evidenced in the teachings of Osborne (column 1, lines 40-42, 67, column 2, lines 1, 22-25, 42-45, 55-61).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate reading data directly from the remote memory into the local memory in Schwab's method in order to conserve host processing cycles, increase the number of cycles available to application programs, and decrease the delay in receiving messages.

5. Claims 7-8, 15-16, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwab in view of Kinoshita et al. (hereinafter "Kin", 6,219,583 B1) in further view of Osborne and in further view of Krishnan et al. (hereinafter "Krishnan", 4,922,416) and in further view of Chow et al (hereinafter "Chow", 6,052,387).

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As per claims 7, 15, and 23, the combined teaching of Schwab, Kin, Osborne, and Krishnan does not explicitly disclose write descriptors with the sequence inserted into the immediate data field on the last segment of each request.

However, in an analogous art, Chow discloses a last buffer bit, one field of the buffer descriptor, that indicates that the buffer descriptor is the last one of the linked list and thus the end of the data (column 4, lines 26-27, 38-40, 44-46, column 6, lines 39-41, column 8, lines 56-60, column 8, lines 12-16, column 9, lines 19-21, 25-26, 29-30). Therefore, Chow implicitly discloses write descriptors with the sequence inserted into the immediate data field on the last segment of each request.

One of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate the use of descriptors with the sequence inserted into the immediate data field on the last segment of each request in Schwab's method in order to determine the end of a data to be read or written thereby decreasing the time it takes to read or write data and reducing the delay in data transfer.

As per claims 8, 16, and 24, the combined teachings of Schwab, Kin, and Osborne does not explicitly disclose the completion of data transfer is based on the immediate data that arrives with the last data segments of each write operation.

However, in an analogous art, Chow discloses a last buffer bit, one field of the buffer descriptor, that indicates that the buffer descriptor is the last one of the linked list and thus the end of the data process (column 4, lines 26-27, 38-40, 44-46, column 6, lines 39-41, column 8, lines 56-60, column 8, lines 12-16, column 9, lines 19-21, 25-26,

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29-30). Therefore, Chow implicitly discloses the completion of data transfer is based on the immediate data that arrives with the last data segments of each write operation.

One of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate completion of the data transfer is based on the immediate data that arrives with the last data segments of each write operation in Schwab's method in order to determine the end of the written or read data thereby decreasing the time it takes to read or write data and reducing the delay in data transfer.

Response to Arguments

6. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of new ground(s) of rejection.
7. According to the Schwab reference, the "type of field (355)" indicates the type of message. Column 8, lines 1-6 shows that a "write message, i.e., a message to initiate a write block transfer, is sent in the type field 355".

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,093,780

U.S. Patent No. 5,909,546

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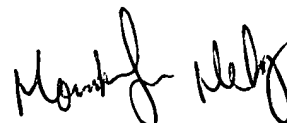
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara N Burgess whose telephone number is (703) 305-3366. The examiner can normally be reached on M-F (8:00am-4:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Ettinene can be reached on (703) 308-7562.. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7240 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Barbara N Burgess
Examiner
Art Unit 2153

February 10, 2003


MOUSTAFA M. MEKY
PRIMARY EXAMINER